REMARKS

Status of Claims

Claims 1- 4, 7-13, 15-16, 20-22 are pending.

Claims 5-6, 14, and 17-19 are canceled.

Applicant's Comments to Examiner's Response to Arguments

Examiner has provided useful comments, for which the Applicant expresses its thanks. In particular, Examiner alleges the structural limitations argued of base claim 1, and by extension, base claims 10 and 15, regarding a thermal imaging system, are not actually claimed. Applicant has herein amended these claims accordingly, all of which is supported in the specification. No new matter is added.

With regard to claims 7 and 20, Examiner alleges they do not recite the intended limitation with respect to the lens assembly, Applicant notes claim 7 to be dependent on claim 1, and claim 20 to be dependent on claim 15, and claims 1 and 15 as amended herein provide that the shutter, when shut, isolates the system from heat radiating from the scene; therefore there cannot be a lens on the scene side of the shutter. The lens, be it a single lens or a lens asembly, is entirely between the shutter and the FPA, all as is supported by the specification. No new matter is added.

These amendments should fully align the claims with the arguments previously presented and thereby overcome the rejections.

Claims Objections

Claims 1-4, 7-9, 17-18 were objected to, but have been amended herein to cure the objections.

Claim Rejections – 35 USC § 103

The Office has substantially repeated its prior rejections using the same references and the same arguments as in the prior Office Action. Applicant in traverse incorporates by reference its prior arguments, its comments above reflecting the impact of the amendments to base claims 1 and 15, and comments further as follows.

Claims 1-4, 8-13, 15-16, 21-22:

The Office rejected Claims 1-4, 8-13, 15-16, 21-22 under 35 U.S.C. 103(a) as being unpatentable over Bakhle et al. (US 6,061,092) in view of Medina US 5,08 1,530). Applicant has carefully considered the Office rejections and respectfully submits that the amended claims, as supported by the comments above and the arguments herein, are distinguishable from the cited references.

It is not enough to merely attribute the elements of the Applicant's claims to the references and summarily conclude the claims to be obvious. "...[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *See Lee*, 277 F.3d at 1343-46; *Rouffett*, 149 F.3d at 1355-59." *In re Kahn* (Fed. Cir. 2006, 04–1616).

The Applicant's disclosure, and the claims as amended, are directed particularly to *thermal* imaging systems and configurations thereof for sensing the thermal emission pattern of an external scene not otherwise illuminated. Thermal imaging systems have unique characteristics and requirements not present in illuminated scenes where *reflected* energy, rather than *thermal emission*, is the basis of the imaging system. Neither Bakhle nor Medina is directed to thermal imaging where the internal radiant flux of the system is orders of magnitude greater than the sensed external scene thermal

radiation. In order to achieve the required sensitivity to detect the very small difference between the external scene radiation and the internal radiant flux, the thermal imaging systems according to the Applicant's invention should correct for the *all* of internal radiant flux inherent in the imaging system, meaning and intending as is explained in the specification that all elements of the system that direct other than external scene thermal radiation to the pixel array need to be captured in the closed state image signal, precisely because they are all present in the open state external scene image signal.

Put another way, the basic difference between the Applicant's process and Bakhle's is that with Bakhle's CMOS devices, which work in the visible part of the spectrum, the Dark Fixed Pattern Noise (DFPN) is inherent to the detector array, whereas for arrays operating in the LWIR range, particularly un-cooled arrays, the non-uniformity is a consequence of emission from the imaging sensor system as well as from non-uniformities inherent to the detector array. Since emissions from the sensor system fall non-uniformly on individual detectors, they are a source of non-uniform detector response. Placing the shutter in front of the lens such that closing the shutter closes the system to external radiation enables a more complete correction of the final image. Otherwise, the correction process is only partially executed, correcting the detector array DFPN, but not the sensor system emission induced DFPN.

Referring to Applicant's paragraphs [0016], [0024], [0025], Figure 1, and paragraphs [0027],[0028] and elsewhere in the specification, the details and advantages of the front of lens shutter configuration are further explained. The convention of thermal imaging systems at the time of the invention was to place the shutter adjacent to the FPA, for several practical reasons. Systems were commonly cryogenically cooled. The lens was confined within the cooling envelope. There was room between the lens and the FPA for the shutter, and placement there kept the shutter relatively small. The conventional packing configuration made sense at the time. Applicant further provides among the claims for correcting for offset using external scene and closed shutter states where the internal flux is always present, and for correcting pixel-to-pixel non-

uniformities, which for example might include correcting pixel gain using different reference level scene signals. Applicant is not aware of any thermal imaging system technology of the day that recognized or embraced the idea of putting the shutter outboard of the lens and correcting image signals in the manner claimed, for the advantages described.

Regarding claims 1, 10, 15 and 16, as amended, Bakke is acknowledged to fail to disclose the claimed shutter/lens/FPA configuration where closing the shutter isolates the system from external radiation, but Bakke is also clearly less relevant by its devotion to reflected light collection imaging rather than thermal imaging, where reflected scene illumination is relatively intense, any internal radiant flux or heat present in the system is not a major consideration, correcting the image signal is limited to discussion of offset, and the dark image subtraction data needs only to reflect electronic conditions within the array itself rather than across the full range of internal system emissions or flux to which the FPA is exposed. Bakke is conventional in its configuration, is not directed to the same technology, and is contrary to claim 1 in that *it teaches* by implication that the shutter is *best placed* between the lens and the FPA. In light of the amendments and these remarks, Applicant requests the rejection be withdrawn.

Medina discloses a video-imaging camera system, again not directed to the unique characteristics of thermal emissions-based imagery and systems. It is of little consequence performance-wise to place the shutter in a visible light system anywhere within a system where isolation and light control is easily managed and the scene is well illuminated so that external image intensity is extremely high compared to internal system conditions. Other more basic criteria such as simple packaging design, component sizing and cost of manufacturing dominate the decision process. Applicant asserts that those skilled in the thermal imaging arts in view of Bakke, and also Sato, Thomas and Yoshida, would not be persuaded by Medina to adopt its front of lens shutter configuration for its claimed thermal imaging methods and systems, and could

not, without inventive effort. In light of amendments and these remarks, Applicant requests the rejection be withdrawn.

Regarding dependent claims 2-4, 8, 9, Applicant incorporates its above remarks and asserts these claims to be allowable at least by reason of being dependent on an allowable base claim, and respectfully quests reconsideration.

Further regarding independent claim 10, the Examiner has admitted this to be a methods claim of the apparatus of claim 1. Applicant asserts this to be true with regard to the claims as amended, and asserts claim 10 to be allowable on that basis.

Regarding claims 11-13 as amended, Applicant incorporates its above remarks and asserts these claims to be allowable at least by reason of being dependent on an allowable base claim, and respectfully requests reconsideration.

Regarding claims 15 and 16, the Office has admitted claim 15 to have all the limitations of claim 1. Applicant asserts this to be true with regard to the claims as amended, and asserts claim 15 and 16 to be allowable for at least this reason.

Claims 7, 20:

Office rejected claims 7 and 20 under 35 USC 103(a) as being unpatentable over Bakhle in view of Medina further in view of Sato's US6,181,484. Applicant in travers incorporates by reference its prior arguments and above comments and remarks further as follows.

Office attributes to Sato a shutter located within 1.97mm of the imaging-side surface of the lens L2 as disclosed at col. 4, lines 48-51, as the further basis for the rejection. Applicant incorporates its above comments and respectfully points out that this analysis is flawed in light of the amendments to claims 1 and 15. Sato's shutter 2 is

located *between* lens L2 and lens L3 of lens group G1, which together with lens group G2 comprises the Sato system lens, as a simple reading of the reference will indicate. Applicant's "lens" in claims 7 and 20 clearly encompasses the entire lens assembly or lens set, with its shutter being outboard of the complete lens set so that the complete lens set is excluded from receiving radiation when the shutter is closed.

To be consistence with claims 7 and 20 as they depend on claims 1 and 15 as amended, Sato's shutter 2 would need to be located on the image side of his outboard lens L7, within the distance specified, which would be outboard of the full lens assembly, and totally contrary to what Sato is teaching.

Based on these remarks it cannot be credibly said that Sato in any way, in any combination with Bakke, Medina, Thomas, or Yoshida, suggests both the configuration and dimension of claims 7 and 20, particularly in light of the context and limitations of the base claims upon which they depend, and therefore Applicant respectfully requests the rejection be withdrawn. In addition and/or in the alternative, Applicant asserts claims 7 and 20 to be allowable at least by reason of being dependent on respective allowable base claims, and therefore requests reconsideration.

Telephone Interview

Present Office policy places great emphasis on telephone interviews initiated by the examiner. For this reason, it is not necessary for an attorney to request a telephone interview. Examiners are not required to note or acknowledge requests for telephone calls or state reasons why such proposed telephone interviews would not be considered effective to advance prosecution. However, it is desirable for an attorney to call the examiner if the attorney feels the call will be beneficial to advance prosecution of the application. MPEP§408

Applicant believes the above amendments and remarks to be fully responsive to the Office Action, thereby placing this application in condition for allowance. No new matter is added. Applicant requests speedy reconsideration, and further requests that Examiner contact its attorney by telephone, facsimile, or email for quickest resolution, if there are any remaining issues.

Respectfully submitted,

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